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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

SHANLEY, DANIEL G

ART UNIT PAPER NUMBER

3723

DATE MAILED: 12/11/2003

12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/616,794

Applicant(s)

ELLEDGE, JASON B.

Examiner

Daniel G. Shanley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/26/02.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 40, 43 and 46-79 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 40, 43, 47-49, 51-52, 54-57, 59- 60, 62-66, 68-69, 72-75 and 77-78 is/are rejected.
- 7) ☒ Claim(s) 50, 53, 55, 58 and 61 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 47-49, 52, 55-57, 60, 63-66, 68-69, 72-75 and 77-78 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

i. Claim 47 recites the limitation "the opening in the planarizing medium" in line 8.

There is insufficient antecedent basis for this limitation in the claim.

ii. Claim 48 recites the limitation "the elongated slot through the planarizing medium" in lines 7-8. There is insufficient antecedent basis for this limitation in the claim.

iii. Claim 49 recites the limitation "the first elongated slot through the planarizing medium" in lines 7. There is insufficient antecedent basis for this limitation in the claim.

iv. Claim 52 recites the limitation "the first slot through the planarizing medium" in lines 4-5. There is insufficient antecedent basis for this limitation in the claim.

v. Claim 55 recites the limitation "the opening in the planarizing medium" in line 8. There is insufficient antecedent basis for this limitation in the claim.

vi. Claim 56 recites the limitation "the elongated slot through the planarizing medium" in lines 7-8. There is insufficient antecedent basis for this limitation in the claim.

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- vii. Claim 57 recites the limitation "the first elongated slot through the planarizing medium" in line 7. There is insufficient antecedent basis for this limitation in the claim.
- ix. Claim 60 recites the limitation "the first slot through the planarizing medium" in lines 4-5. There is insufficient antecedent basis for this limitation in the claim.
- x. Claim 63 recites the limitation ""the first elongated slot through the planarizing medium" in line 6 and "the opening in the planarizing medium" in line 8. There is insufficient antecedent basis for this limitation in the claim.
- xi. Claim 64 recites the limitation "the elongated slot through the planarizing medium" in line 7. There is insufficient antecedent basis for this limitation in the claim.
- xii. Claim 65 recites the limitation "a second elongated slot through the backing pad" in line 6 and "the first elongated slot through the planarizing medium" in line 7. There is insufficient antecedent basis for this limitation in the claim.
- xiii. Claim 66 recites the limitation "the first elongated slot" in line 11 and "the first elongated slot through the planarizing medium" in line 14. There is insufficient antecedent basis for this limitation in the claim.
- xiv. Claims 68 and 69 recite the limitations "the first slot through the planarizing medium" in lines 4. There is insufficient antecedent basis for this limitation in the claim.
- xv. Claim 72 recites the limitation ""the first elongated slot through the planarizing medium" in line 6 and "the opening in the planarizing medium" in line 8. There is insufficient antecedent basis for this limitation in the claim.
- xvi. Claim 73 recites the limitation "the elongated slot through the planarizing medium" in line 7. There is insufficient antecedent basis for this limitation in the claim.

xvii. Claim 74 recites the limitation "with the first the elongated slot through the planarizing medium" in line 7. There is insufficient antecedent basis for this limitation in the claim.

xviii. Claim 75 recites the limitation ""the first elongated slot through the planarizing medium" in line 11 and "the first elongated slot throught the planarizing medium" in line 14. There is insufficient antecedent basis for this limitation in the claim.

xix. Claim 78, recites the limitation "the first elongated slot" in lines 4-5. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1) Claims 40, 43, 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pecan.

An apparatus and method for in-situ monitoring of thickness during chemical-mechanical polishing (CMP) of a substrate using a polishing tool and a film thickness monitor. The tool has an opening placed in it. The opening contains a monitoring window secured in it to create a monitoring channel. A film thickness monitor (comprising an ellipsometer, a beam profile reflectometer, or a stress pulse analyzer) views the substrate through the monitoring channel to provide an indication of the

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thickness of a film carried by the substrate. This information can be used to determine the end point of the CMP process, determine removal rate at any given circumference of a substrate, determine average removal rate across a substrate surface, determine removal rate variation across a substrate surface, and optimize removal rate and uniformity.

While the belt of one embodiment contains only one opening, ***a plurality of openings can be used***. As shown in FIG. 3, the belt 310 can contain a plurality of openings 320, 322, 324, 326, 328. For each opening 320, 322, 324, 326, 328 in the belt 310, there is a corresponding opening 330, 332, 334, 336, 338 in the platen under the substrate carrier 340. Each opening 330, 332, 334, 336, 338 is aligned with a respective film thickness monitor. As above, each opening can be closed by a monitoring window.

In this figure, there are five openings, one at the center of the substrate and four arranged at 90 degree intervals. ***It is appreciated that the number or the pattern of the openings is a design choice. For example, the openings can be linearly or concentrically arranged. Both of which could be interpreted as elongate.*** With several film thickness monitors distributed under respective locations of the belt 310, non-uniformity of the polishing process across the substrate surface can be ascertained.

In reference to claims 54, 62, 71, and 79 the belt or planarizing medium, has a polishing material and is formed around a woven Kevlar fabric. It has been found that a 16/3 Kevlar, 1500 Denier fill and a 16/2 cotton, 650 Denier warp provide

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the best weave characteristics. As is well known in the art, "fill" is yarn in the tension-bearing direction, and "warp" is yarn in the direction perpendicular to the tension bearing direction. "Denier" defines the density and diameter of the mono-filament. The first number represents the number of twists per inch, and the second number refers to the number of filaments that are twisted in an inch.

The woven fabric is placed in a mold that preferably has the same dimensions as the stainless steel belt described above. ***A clear polyurethane resin (as described in more detail below) is poured into the mold under a vacuum, and the assembly is then baked, de-molded, cured, and ground to the desired dimension. The resin may be mixed with fillers or abrasives in order to achieve desired material properties and/or polishing characteristics.*** Since fillers and abrasive particles in the polishing layer may scratch the polished article, it is desired that their average particle size be less than about 100 microns. Such a belt can be obtained pre-constructed from Belting Industries.

Pecan does not explicitly disclose the sequential polishing of multiple substrates and subsequent removal of the substrate after polishing. However, these are inherent traits of the device and a continuous conveyor belt. It would have been obvious to one of ordinary skill in the art at the time the invention was made to either remove the substrates with a machine or by hand after polishing and to repeat the entire process for an additional substrate for efficacy of the CMP process. The machine was not designed for polishing one substrate, but for continuously repeating the process in a efficient manner.

2) Claims 51, 54, 59, 62, 67, 71, 76, and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pecen, as modified above, in further view of Redeker.

Pecen, as modified above, discloses all of the limitations of the invention except, does not disclose a backing sheet. Redeker discloses such a backing sheet for CMP polishing. It would have been obvious to one having ordinary skill in the art at the time the Pecen invention was made to have further modified the device and included a backing sheet as taught by Redeker, since Redeker states at column 3, lines 35-41, that such a modification would support the underside of the polishing sheet so that the polishing surface abrades the surface of the substrate with a substantially uniform pressure.

Allowable Subject Matter

Claims 50, 53, 55, 58, and 61 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 47-49, 52, 56-57, 60, 63-66, 68-69, 72-75, and 77-78 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.


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Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel G. Shanley whose telephone number is 703-305-0306. The examiner can normally be reached on M-F 0830-1700.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Hail can be reached on 703-308-2687. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9302 for regular communications and 703-872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1148.


Daniel Shanley
Art Unit 3723
Patent Examiner

DGS
December 8, 2003


Joseph J. Hail, III
Supervisory Patent Examiner
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